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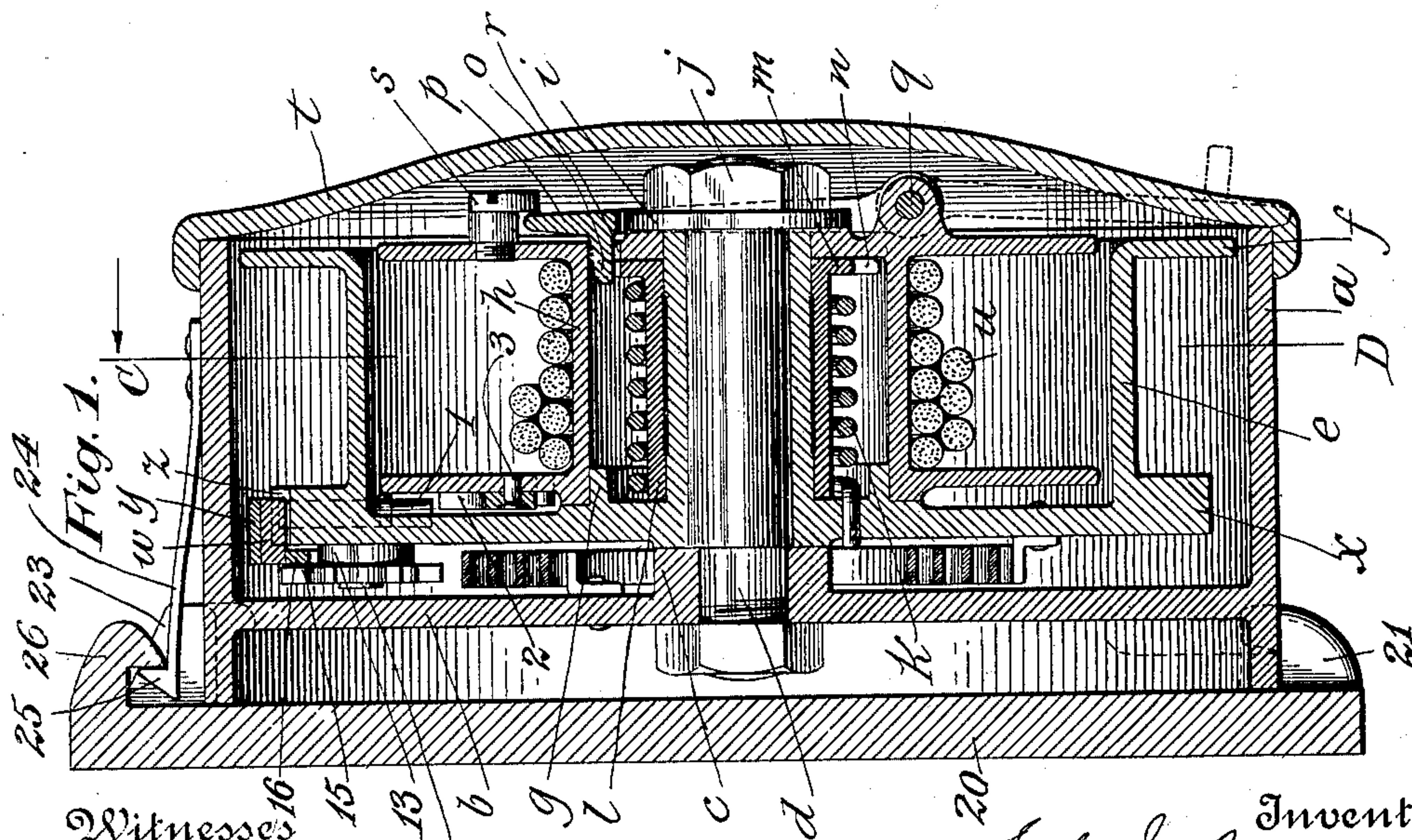
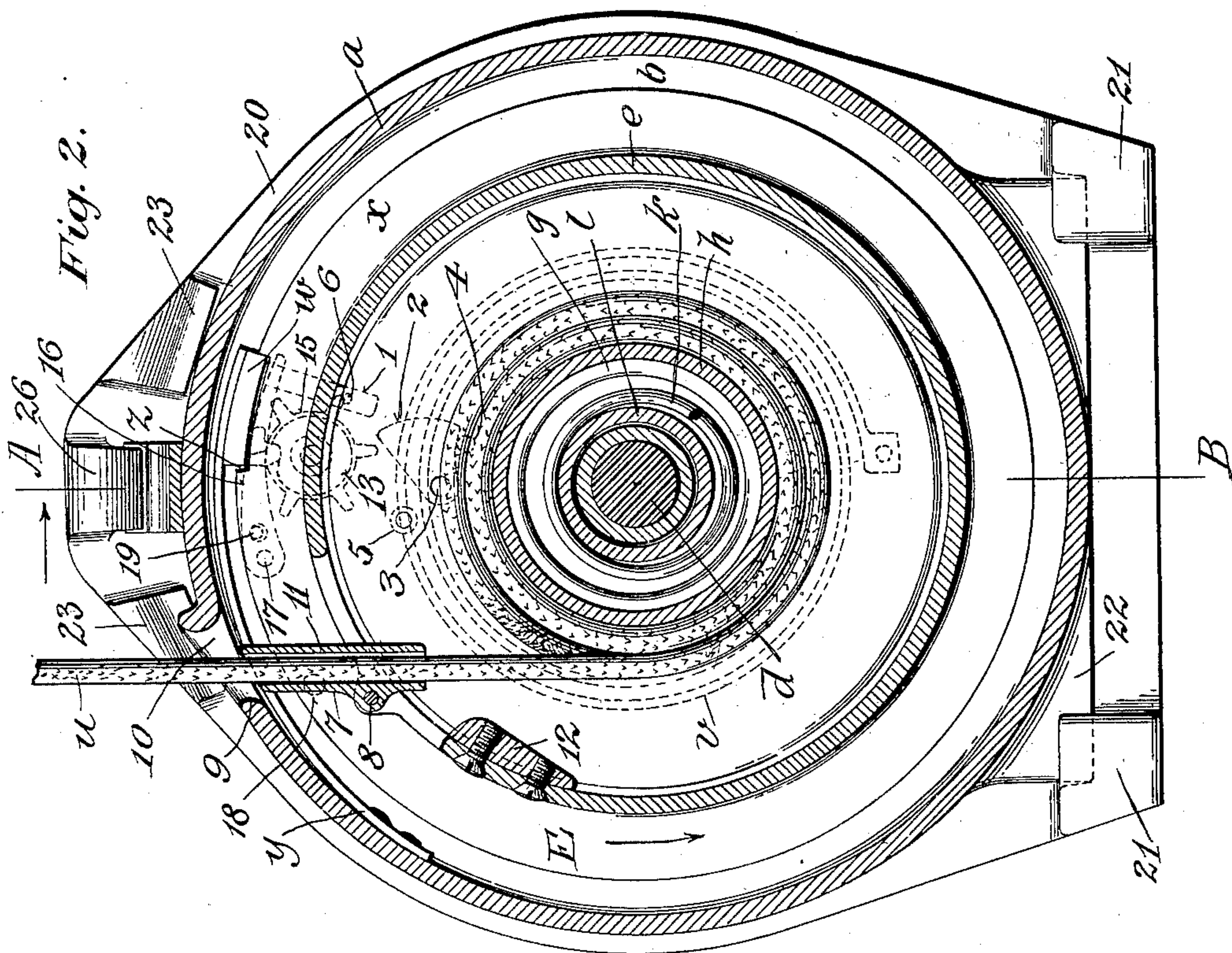
Patented Feb. 4, 1902.

S. J. BUCKLAND.
TAKE-UP DEVICE FOR TROLLEY CORDS.

(Application filed Mar. 6, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Chas. P. Church
M. A. Campbell

Inventor
Seth J. Buckland
By his Attorney
Wm. F. Bellona

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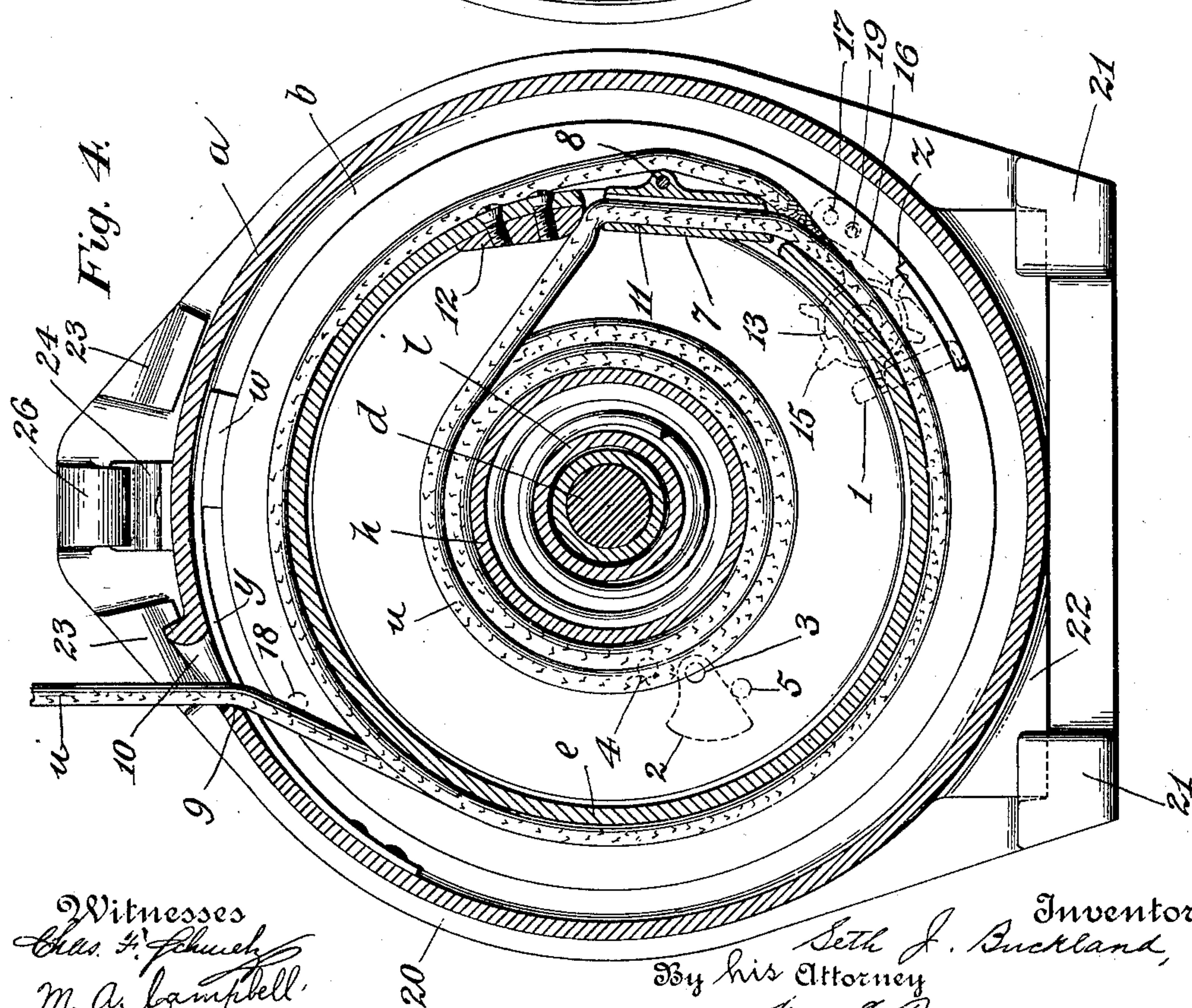
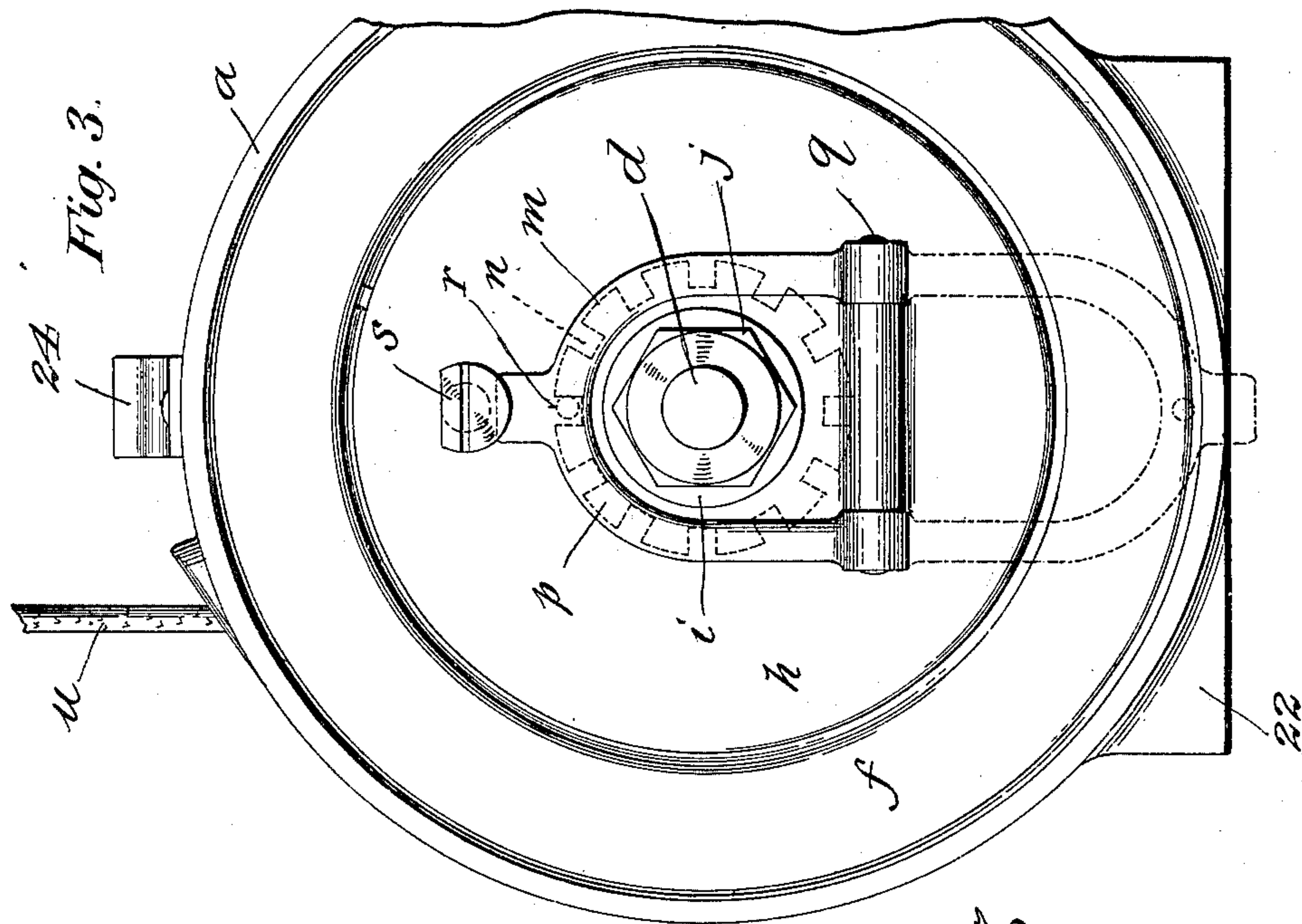
S. J. BUCKLAND.

TAKE-UP DEVICE FOR TROLLEY CORDS.

(Application filed Mar. 8, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses
Chas. F. Church
M. A. Campbell

Inventor
Seth J. Buckland,
By his Attorney
Wm. J. Bellows

UNITED STATES PATENT OFFICE.

SETH J. BUCKLAND, OF SPRINGFIELD, MASSACHUSETTS.

TAKE-UP DEVICE FOR TROLLEY-CORDS.

SPECIFICATION forming part of Letters Patent No. 692,421, dated February 4, 1902.

Application filed March 6, 1901. Serial No. 50,011. (No model.)

To all whom it may concern:

Be it known that I, SETH J. BUCKLAND, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Take-Up Devices for Trolley-Cords, of which the following is a full, clear, and exact description.

My invention relates to an improved device of the class which is normally operable to take up the ordinary slack of the trolley-cord and which when the movement of the take-up may from any cause be increased to a very rapid one, as caused by the disengagement of the trolley from the trolley-wire, said take-up device will become effective in putting in operation a winding mechanism, which is normally locked against movement, so that then the latter may wind up the trolley-cord and draw the trolley down below the level of the trolley-wire and the cross-supporting wires therefor.

The invention consists in the combination and arrangement of devices and the construction and combination of parts, all substantially as hereinafter fully described, and set forth in the claims.

In the accompanying drawings, in which similar characters denote similar parts, Figure 1 represents a central vertical section of my improved device, taken on line A B of Fig. 2. Fig. 2 is a section taken on line C D of Fig. 1, illustrating the parts in their normal condition, the take-up device only being effective in taking up the slack of the trolley-cord. Fig. 3 is a front view of my improved mechanism, the outside cover being removed and the positions of the parts corresponding to those of Fig. 2; and Fig. 4 is a section similar to Fig. 2, but showing the winding mechanism after it has become effective in winding up the trolley-cord.

In the drawings, *a* denotes the casing adapted for containing the various devices and mechanisms for operating the trolley-cord. This casing is substantially cylindrical in form and comprises a bottom plate *b*, having near the center thereof a hub *c*, which is adapted to receive and hold a stud *d*, upon which the movable devices are supported. These devices comprise a winding mechanism,

shown herein as a cylindrical drum *e*, having a front flange *f* and rear flange *z*, which is acted upon to normally retain said drum against movement in a manner as will be hereinafter set forth. The bottom plate or web portion of the drum *e* is preferably provided with an annular projection *g*, the outer face of which serves as a bearing-face or support for the take-up device, shown as a spool *h*, the forward end of which is journaled on the hub of the drum *e*, so that virtually the take-up spool *h* is in this instance journaled on the winding-drum *e*, while a washer *i* and nut *j* on the stud *d* may serve to retain these parts in operative position, and yet so that the spool *h* may rotate on and independently of said winding-up drum *e*.

Means are provided whereby the take-up device *h* may be properly actuated to take up the slack of trolley-cord, these means consisting, preferably, of a spring *k*, one end of which is secured or held on the web of the drum *e*, while the other end thereof is in operative connection with the spool *h*.

Inasmuch as it is frequently desirable that the tension of the spool-actuating device—viz., of the spring *k*—may be adjusted according to different requirements, I preferably employ a sleeve *l*, journaled on the hub of the drum *e* and having a flange *m*, which is preferably provided with a plurality of notches or apertures *n* and which is directly actuated by the spring *k*. The notches *n* are adapted to be engaged by a projection *o*, which may be provided on a lever *p*, pivotally supported, as at *q*, on the front face of the spool *h*, so that said lever will be caused to rotate therewith, the projection *o* passing through a suitable aperture or opening *r*, provided therefor in the front wall of the spool *h*.

From the description above given it will be readily understood that when the lever *p* is swung so as to bring the projection *o* out of contact with the notches *n* the spool *h* may be rotated independently of and relatively to the sleeve *l* and that when said spool has been rotated sufficiently and the lever *p* is returned to its position the tension of the spring may be varied, as described.

Means are provided whereby the lever *p* may be maintained in its operative position, these means consisting, preferably, of a screw *s*, the

head of which is cut away at one side, as shown in Figs. 1 and 3, so that when said screw is turned until the cut-away portion is opposite the end of the lever *p* said lever may be swung outward, it being of course supposed that the cover *t* is removed beforehand. The lever *p* may be swung around its pivot until it comes to rest against the outer edge of the casing *a*, as shown in Figs. 1 and 3, when the projection *o* may serve for a handle for rotating the spool, as described.

Wound on the body portion of the spool is a flexible band *u*, which is herein shown as a cord and to which the trolley-cord may be secured in any suitable manner, so that from the foregoing description it will be seen that said cord will be normally wound up to take up a slack, the tension of the actuating-spring being adjusted as required.

As has above been stated, the take-up device or spool *h* is rotatably supported on and independently of the winding-up mechanism, which is normally held against movement and which becomes operative or effective to wind up the trolley-cord whenever the rotative movement of the take-up device becomes accelerated—as, for instance, when the trolley-wheel has left the wire, in which case the pole-springs, which ordinarily serve for holding the said wheel in contact with the wire, will throw said pole upward, and consequently into position where it may strike the guide-wires, whereby the trolley-wire is supported.

The means for actuating the winding-up mechanism may be of any suitable construction and are illustrated herein as a spiral spring *v*, one end of which may be secured to the base-plate *b* of the casing *o*, while its other end may be attached to the web portion of the drum *e*, said spring being of sufficient strength to overbalance the efficiency of the pole-springs on top of the car.

The means for normally retaining the winding-drum *e* against rotative movement comprise in the present instance a detent *w*, adapted for engagement with the flange *x* of the drum *e*, said detent being preferably forced into contact with said flange by a spring *y*, made in the form of a blade and secured with one end on the inner side of the casing *a*. While primarily it is immaterial in which manner the detent *w* may prevent rotation of the drum *e*, I preferably provide in the flange *x* a notch *z*, so that when said drum is properly positioned relatively to the detent or, in other words, ready to operate for winding up the cord, said detent may enter said notch *z* somewhat after the manner shown in Figs. 1 and 2.

Means are provided whereby the winding-up drum may be released from its detent upon the acceleration of the take-up device, these means consisting in the present instance of a slide, one end held for lengthwise movement in the flange *x* of the drum *e* and resting with one end against the detent *w*, while its other end is disposed in the path of a centrifugally-

positioned latch 2, which is pivotally supported, as at 3, on the rear flange of the take-up spool *h* and which is normally gravitative, so as to avoid striking the end of the slide during the normal or slow travel of the take-up device. While during the last-named conditions the latch 2 will swing toward the center of the spool-support until stopped by a pin 4 during its revolution therewith, its outward movement into its operative position may be limited by a stop-pin 5, against which said latch will come to a rest and be then ready to operate on the slide, only the outward movement thereof being limited in the present instance by a pin 6 engaging the inner wall of the drum-body *e*.

From the foregoing description it will be understood that the normal movement of the take-up device as caused by the inclination of the trolley-wire will serve only to take up a slack in the cord; but that when said movement is abnormally accelerated said take-up device will become effective for disengaging the locking device of the winding-up mechanism therefrom, whereupon the spring *v* will immediately cause a rotation of said winding mechanism in the direction of arrow E. (See Fig. 2.) In this figure it will be noticed that the band or cord *u* traverses a device which is pivotally held on said drum *e* and which in the present instance constitutes one of the features of my invention and serves as a means for causing the band to move with the winding mechanism after the latter is released from its locking device. This clamping device 7 is shown pivoted at 8 on the body of the drum *e* and intermediate its ends and is so disposed relatively to the travel or longitudinal movement of the band *u* that when said drum *e* is rotated in the direction of arrow E said clamping device will be tilted by the resultant deflection of the line of travel of the cord and into position substantially as shown in Fig. 4, this deflection being caused by the cord being maintained in position or drawn over a wheel 9 of an opening or aperture 10, provided in the casing *a*. The clamping device 7 has a working face 11, the upper end of which will be actuated for tilting said device until the cord is caught and clamped between the lower end of said working face and a fixed jaw 12, the lower end of said working face constituting substantially a movable jaw cooperative with the fixed jaw and positioned by the line of travel of the band, while in its turn the clamping device is dependent upon the movement of the winding-drum for causing a deflection of the cord, so that the clamping device is in reality controlled by the movement of said drum.

As above stated, my invention comprises as one of its features a mechanism whereby the locking device of the winding-drum when once released therefrom may be maintained in inoperative position. This device is in the present instance progressively movable, so that said drum may make several rotations,

while during each of such rotations said mechanism is progressively advanced and is movable in one direction for keeping the locking means out of engagement with the winding mechanism, while it is movable in the other direction by the return movement of said drum to its original position, when it will again be in position to permit the locking device to engage said drum. The mechanism herein shown comprises a cam 13, journaled on a stud 14, which is held in the web of the drum and which may also support a star-wheel 15, connected with said cam in any suitable manner. The cam 13 is operatively connected with the detent *w*, preferably through the intervention of a lever 16, pivoted at 17 on the flange of the winding-drum and adapted to rest with its upper side against the lower surface of said detent, the organization of the parts being such that when said cam is partially rotated said lever 16 will be caused to swing outward around its pivot 17 and until the detent *w* is clear of the notch *z* in the flange *x*, above described. This partial rotation is imparted to the cam 13 by means of the teeth of the star-wheel 15, which during its revolution around the center of and with the winding-drum *e* will be successively engaged by a pin 18, secured to the plate *b* of the casing *a*, this partial rotation taking place step by step and upon each complete rotation on the part of the winding-drum. While ordinarily the cam 13 may engage the detent *w* directly and without the intervention of the lever 16, I deem it preferable to employ this construction, inasmuch as the lever 16 when held in its outward position by said cam will serve at the same time to bridge over the notch *z* in the flange *x*, while any movement of said lever 16 beyond the outer circumference of said flange *x* may be prevented—as, for instance, by a stop-pin 19. Furthermore, the lever 16 will, when moved outward by the cam 13, act as a brake on said cam on account of being in contact with a spring-actuated detent *w*, the spring-pressure of which will force said lever 16 tightly in contact with the cam 13, and therefore tend to arrest the rotative movement thereof when acted upon by the pin 19, as will be readily understood.

My improved trolley take-up is, as its name implies, to be used in connection with cars operated by electricity which is carried on an overhead wire, and it is necessary for the convenience of handling the same that the position of said device on the car shall be such that the employees may have free access of the trolley-cord for the purpose of reversing the position of the pole when required. In the drawings I have shown a base-plate 20, which may be secured to the dasher of the car and which in turn is adapted to removably receive my improved device, said base-plate being provided with lugs 21, adapted for the reception of a projecting flange 22, secured to or formed integral with the casing *a*, while at the upper side of said casing said base-plate

20 may be provided with projecting ears 23, beneath which said casing may be placed and whereby the same is prevented against dislodgement by any sudden pull which may be brought to bear upon the trolley-cord. The casing *a* is in the present instance held in proper place and in engagement with said means 23 by a spring 24, having a hook end 25, adapted for engagement with a catch 26, formed on the base-plate 20, so that when required it is only necessary to depress the spring 24 when the casing *a* may be withdrawn from under the ears 23 and then lifted bodily out of the lugs 21.

The operation of my improved take-up device is as follows: The apparatus being properly positioned on the dasher of a car, the trolley-cord is connected with the flexible band *u*, when the tension of the actuating-spring *k* may be increased or decreased by first disengaging a lever *p* and its projection *O* from the notches *n* of the spring-actuated disk or flange *m*, whereupon said spool may be rotated in the proper direction and then secured to said disk by returning the lever *p* into its normal position. It is supposed that the spring *v*, whereby the winding mechanism is operated, is of sufficient strength to counterbalance the efficiency of the pole-springs, so that when the drum *e* is rotated by said spring the trolley-cord may be wound up thereon and the pole pulled down sufficiently to clear the guide-wire. During the ordinary run of the car the gradual inclination of the trolley-wire will cause the trolley-cord to slack more or less, and this slack is taken up on the take-up spool *h*. When now the trolley should leave the wire and the trolley-cord should consequently be pulled upward with great rapidity, thereby accelerating the paying-out movement of the take-up spool *h*, the latch 2 will be centrifugally positioned until it rests against the stop-pin 5, when during its revolution around the axis of said spool it will come into engagement with the slide 1 and force the same outward sufficiently to raise the detent *w* out of engagement with the notch *z* and the flange *x*. The spiral spring *v* will now immediately become effective in rotating the winding-drum, this rotation resulting in deflecting the line of travel of the flexible band *u* until substantially in tangential relation with the body portion of said drum, when said cord will be clamped between the lower edge of the working face 11 and the fixed jaw 12, so that the band *u* will be caused to move with said winding-drum and will consequently be wound thereon, as is clearly shown in Fig. 4. During this revolution with the drum *e* one of the teeth of the star-wheel 15 will come into contact with the stop-pin 18, whereby said wheel will be caused to make a partial rotation, thereby turning the cam 13 sufficiently to swing the lever 16 outward, so as to bridge over the notch *z* and the flange *x*. Upon the succeeding rotation of the drum *e* the next succeed-

ing tooth of the star-wheel will be engaged by the stop-pin 18 and turn the same for another part of a rotation, which, however, does not alter the position of the lever 19, the star-wheel shown in the drawings having six teeth, so that the drum may practically make nearly six complete rotations before the cam is again in a position as it was originally. As soon as the decreasing efficiency of the spiral spring *v* and the increasing efficiency of the trolley - pole springs counterbalance each other the drum *e* will come to rest, the trolley-pole being by this time in position to clear the guide-wires. In order to replace the trolley on the overhead wire, it now becomes necessary to unwind the flexible band *u* from the winding-drum *e*, and it is evident that when said band *u* is pulled upward the winding-drum *e* will now be rotated in the opposite direction, the star-wheel being turned backward one notch for each complete rotation of the drum *e*, so that finally when said band has been entirely unwound from said drum the cam 13 will have been returned to its original position to permit the lever 16 to move inward, and thus allow the detent *w* to enter and engage the notch *z* and the flange *x*. Likewise it will be understood that by the backward rotation of the drum *e* the spiral spring *v* will be again wound to its maximum or original efficiency, while, on the other hand, the spring *k* for actuating the take-up spool has not been interfered with, and the device as a whole is now again ready to operate, as before.

It is evident that the particular construction and organization of the various devices may be altered in a great many respects without departing from the gist of my invention, and it should be distinctly understood that I do not limit my invention to the precise construction of the several parts as illustrated in the drawings and described in the specification.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a take-up device; means for actuating the same; and means for varying the efficiency of the actuating means; of a winding mechanism; and a device for normally locking said mechanism against movement.

2. The combination, with a winding mechanism; and with a device for normally locking said mechanism against movement; of a rotatable spool; a disk movable relatively to the spool, and having a plurality of apertures; a spring for actuating said disk; and a lever pivoted on the spool and having a projection for engaging said apertures.

3. The combination, with a winding mechanism; and with a device for normally locking the same against movement; of a rotatable spool; a disk movable relatively to the spool and having a plurality of apertures; a lever pivoted on the spool and having a projection for engaging said apertures; a spring

for actuating said disk; and means for securing said lever in position.

4. The combination, with a take-up device; a winding mechanism; and a device for normally locking said mechanism against movement; of means for releasing said winding mechanism; and a mechanism for maintaining said locking device in inoperative position.

5. The combination, with a take-up device; a winding mechanism; and a device for normally locking said mechanism against movement; of means for releasing said winding mechanism; and a progressively-movable mechanism for maintaining said locking device in inoperative position.

6. The combination, with a take-up device; a winding mechanism; and a device for normally locking said mechanism against movement; of means for releasing said winding mechanism; a progressively-movable mechanism for maintaining said locking device in inoperative position; and carried by said winding mechanism.

7. The combination, with a take-up device; a rotatable drum; and a device for normally locking said drum against movement; of means for releasing said drum; a mechanism for maintaining said locking device in inoperative position, and operable by the movement of said drum.

8. The combination, with a take-up device; a rotatable winding-drum having a flange; and a device for normally locking said drum against movement; of means for releasing said drum; and a mechanism in engagement with said locking device, and movable in one direction for maintaining said locking device in inoperative position, and movable in the opposite direction for permitting said locking device to engage the drum.

9. The combination, with a take-up device; a winding mechanism; and a device for normally locking said mechanism against movement; of means for releasing said mechanism; a rotatable cam for controlling the locking device, and operable by the movement of said drum.

10. The combination, with a take-up device; a winding mechanism; and a device for normally locking said mechanism against movement; of means for releasing said mechanism; a rotatable cam for controlling the locking device, and operable by the movement of said drum; and means for partially rotating said cam during each complete rotation of said winding mechanism.

11. The combination, with a take-up device; a winding mechanism; and means for normally locking said mechanism against movement; of means for releasing said mechanism; a rotatable cam for maintaining said locking device in inoperative position; a star-wheel for partially rotating said cam during each complete rotation of the winding mechanism; and a stop for partially rotating said star-wheel.

12. The combination, with a take-up device, a rotatable drum; and a device for normally locking said drum against movement; of means for releasing said drum; a rotatable cam for maintaining said locking device in inoperative position; a star-wheel for partially rotating said cam during each rotation of the drum, and mounted for rotation on said drum and revolving therewith; and a stop for engaging said star-wheel.

13. The combination, with a take-up device; a rotatable drum having a flange; and a spring-actuated detent for locking said drum against movement; of means for releasing said drum; a rotatable cam carried on said drum; and a member movable by said cam for preventing the detent from engaging said flange.

14. The combination, with a take-up device; a rotatable winding-drum having a flange; and a spring-actuated detent for normally locking said drum against movement; of means for releasing said detent; a rotatable cam carried on said drum; and a lever movable by said cam and pivoted on said flange; and in engagement with said detent.

15. The combination, with a take-up device; and a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of said take-up device; and means for causing the band to move with the winding mechanism.

16. The combination, with a take-up device; and a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of said take-up device; means for causing the band to move with the winding mechanism; and a clamping device for holding the band in contact with the drum.

17. The combination, with a take-up device; and a flexible band having one end secured thereto, of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of said take-up device; means for causing the band to move with the winding mechanism; a clamping device for holding the band in

contact with the drum, and controlled by the movement of said drum.

18. The combination, with a take-up device; and a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of said take-up device; means for causing the band to move with the winding mechanism; a clamping device for holding the band in contact with the drum, and carried thereon.

19. The combination, with a take-up device; and a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of the take-up device; a fixed jaw carried on said drum; and a movable jaw cooperative therewith, and for holding said band in contact with said drum.

20. The combination, with a take-up device; and a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said winding mechanism, and controlled by the movement of the take-up device; a fixed jaw carried on said drum; and a movable jaw cooperative therewith, and for holding said band in contact with said drum, and positioned by the line of travel of said band.

21. The combination, with a take-up device; and with a flexible band having one end secured thereto; of a winding mechanism; a device for normally locking said mechanism against movement; means for releasing said mechanism, and controlled by the movement of the take-up device; a casing having an opening for the passage of said band; a guiding-wall for the band and for causing a deflection of the line of travel of the band, upon the movement of the winding mechanism; and a clamping device for holding said band in contact with the drum, and controlled by the movement thereof.

Signed by me at Springfield, Massachusetts, this 28th day of February, 1901.

SETH J. BUCKLAND.

Witnesses:

WM. S. BELLOWS,
M. A. CAMPBELL.